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A rare case of acute osteomyelitis due to Panton-Valentine leukocidin-positive community-acquired methicillin-resistant *Staphylococcus aureus* in a young healthy adult

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ABSTRACT

INTRODUCTION: Most community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA) infections affect skin or soft tissues, while invasive and life-threatening illnesses including osteomyelitis are less common. CA-MRSA infections occur especially in the pediatric age group, while the occurrence of CA-MRSA osteomyelitis in adults is uncommonly reported.
PRESENTATION OF CASES: A rare case of acute osteomyelitis of the femur caused by Panton-Valentine leukocidin (PVL)-positive CA-MRSA in a 37-year-old man in good health is presented. A pure bone biopsy revealed extensive inflammation, suggestive of acute osteomyelitis, with no evidence of neoplasm, and PVL-positive MRSA was isolated from the culture. Antibiotic treatment, with 6 weeks of intravenous vancomycin and 4 weeks of clindamycin, followed by 2 weeks of oral linezolid, was given, and 2 years after treatment completion, there has been no relapse of infection.
CONCLUSION: This case strongly suggests that we need to be aware of CA-MRSA osteomyelitis, which requires a high level of suspicion, prompt diagnosis, and appropriate antibiotic treatment.

1. Introduction

Community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA) is defined as MRSA isolated from outpatients with no history of hospitalization within the past 1 year, and who present no other established risk factors for MRSA infection, such as surgery, residence in a long-term care facility, dialysis, or indwelling percutaneous medical devices or catheters. CA-MRSA strains often produce Panton-Valentine leucocidin (PVL), a cytotoxin that causes leukocyte destruction. PVL is an emerging infectious pathogen associated with skin and soft tissue infections, as well as life-threatening invasive diseases including osteomyelitis.

The number of CA-MRSA infections is increasing rapidly. Skin and soft tissue infections represent the majority of CA-MRSA clinical presentations, while invasive and life-threatening illnesses including osteomyelitis are less common. Osteomyelitis alone accounts for only 1% of all CA-MRSA infections [1,2], and it has been widely described in the pediatric age group [3]. CA-MRSA osteomyelitis is uncommonly reported in adults, and, to the best of our knowledge, there have been only nine reported cases of osteomyelitis caused by CA-MRSA in adults [4–10]. The radiographic features of CA-MRSA osteomyelitis in healthy individuals often suggest primary bone tumors [6], and a high level of suspicion with prompt diagnosis is needed for adequate treatment to achieve a better prognosis. In this article, a rare case of acute osteomyelitis of the femur in a young healthy adult caused by CA-MRSA is presented, along with a review of the relevant current literature. This manuscript was written in accordance with the Surgical CAse REport (SCARE) guidelines [11].

2. Presentation of case

A 37-year-old man in good health was admitted to our hospital for left thigh pain that had worsened progressively over 2 months. He had severe pain in his left thigh even at rest, but he had no fever, chills, or night sweats. Physical examination on admission showed no swelling of the thigh and limitation of the range of motion of the hip joint. The peripheral white blood cell count on admission was 4680/μL (3000/μL–9000/μL) with a normal differential, and C-reactive protein (CRP) was 1.82 mg/L

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Fig. 1. Plain radiographs of the left femur on admission.

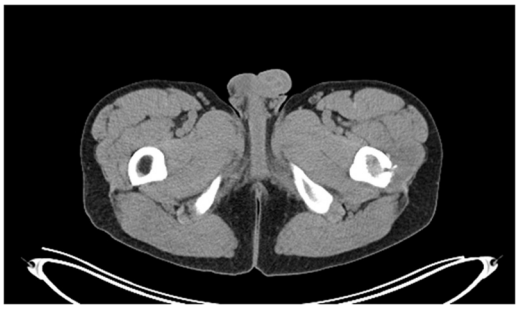

Fig. 2. Computed tomography of the left femur.

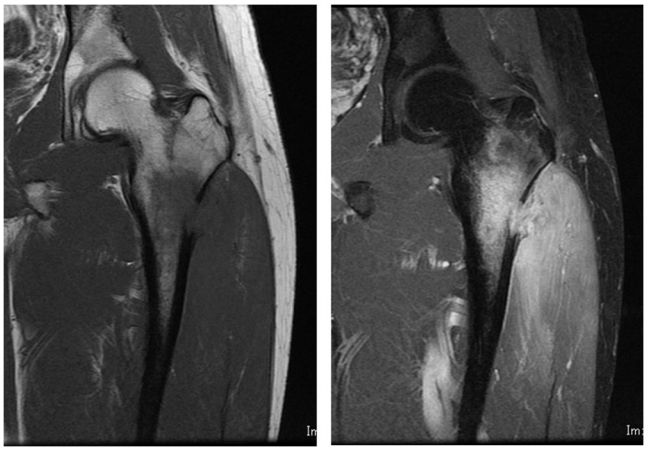

Fig. 3. Magnetic resonance imaging of the left femur. T1-weighted (a) and T2-weighted (b) coronal images.

(0.0–0.3 mg/L). Other laboratory values including alkaline phosphatase and lactate dehydrogenase were within normal limits. Plain radiographs (Fig. 1) and computed tomography (Fig. 2) of the left lower extremity demonstrated a destructive osteolytic lesion in the lateral cortex of the greater trochanter of the left femur with cortical erosion and an irregular periosteal reaction. Subsequent magnetic resonance imaging showed a diffuse abnormal marrow signal throughout the greater trochanter of the left femur extending to the extramedullary area, demonstrating a destructive osteolytic lesion in the lateral cortex of the mid-shaft of the left femur (Fig. 3). Whole body ^{18}F-fluorodeoxyglucose-positron emission tomography (FDG-PET) scanning showed FDG uptake in the left femur, with a standardized uptake value (SUV) of 13.37 (Fig. 4). Clinical differential diagnoses were osteomyelitis and benign or malignant bone tumors, and the patient underwent a pure bone biopsy for histopathological diagnosis. There were granulation tissues with

Fig. 4. Whole body FDG-PET imaging. SUV in the left femur is 13.37.

purulent material coming out of the femur, and no obvious tumor lesion was observed. Microscopically, the specimens of the granulation tissues from both extra- and intra-osseous lesions showed extensive inflammation, suggestive of acute osteomyelitis with no evidence of neoplasm, and PVL-positive MRSA was isolated from the surgical specimens. The patient was then diagnosed with acute osteomyelitis of the femur due to PVL-positive CA-MRSA. Based on the antibiotic sensitivity tests, the patient was given 6 weeks of intravenous vancomycin with 4 weeks of clindamycin, followed by 2 weeks of oral linezolid. At 25 days after the start of treatment, his CRP value decreased to within the normal range. At final follow-up, 2 years after surgery, the function of his left lower limb had recovered perfectly, and he felt no pain at all. He had been able to perform his usual activities of daily living without any problems. On final plain radiographic examination, the osteolytic lesion had disappeared (Fig. 5). Blood examinations also reverted to normal.

3. Discussion

CA-MRSA is defined as MRSA isolated from outpatients with no history of hospitalization within the past year and who